



Figure 3-29. Extent of 1983 excavation within the CPP-27/33 release sites.

excavated area, but the original document that was cited by the report does not confirm this. However, the sides of the excavation shown in Figure 3-28 appear to have a gunite coating for slope stabilization that might have been used to provide some shielding to workers.

In 1987, 10 observation boreholes were drilled to the top of basalt in the CPP-27/33 area to determine the extent of contamination (see Figure 3-30). Direct radiation readings were taken in the observation boreholes using field instruments. No samples were collected from the boreholes for laboratory analysis. Information on the total depth of each borehole is also unavailable. Beta-gamma radiation readings in the boreholes ranged from none detected to 30 mR/hour.

In 1990, a 113-ft-deep borehole was made in the area (completed as monitoring well CPP-33-1, see Figure 3-25). Sixteen soil samples were collected from the soil above the basalt and two soil samples were collected from the 110-ft interbed. The samples were analyzed for a full suite of constituents, including VOCs, SVOCs, metals, dioxins and furans, cyanide, and radionuclides. The primary contaminants detected in the soil were Cs-137 and Sr-90 (Table 3-7). The depth of the highest activities found were between 7 and 29 ft bgs. The maximum activity detected for Cs-137 was 608 ± 3 pCi/g at 25 ft bgs and for Sr-90 was 328 ± 1.8 pCi/g at 17 ft bgs.

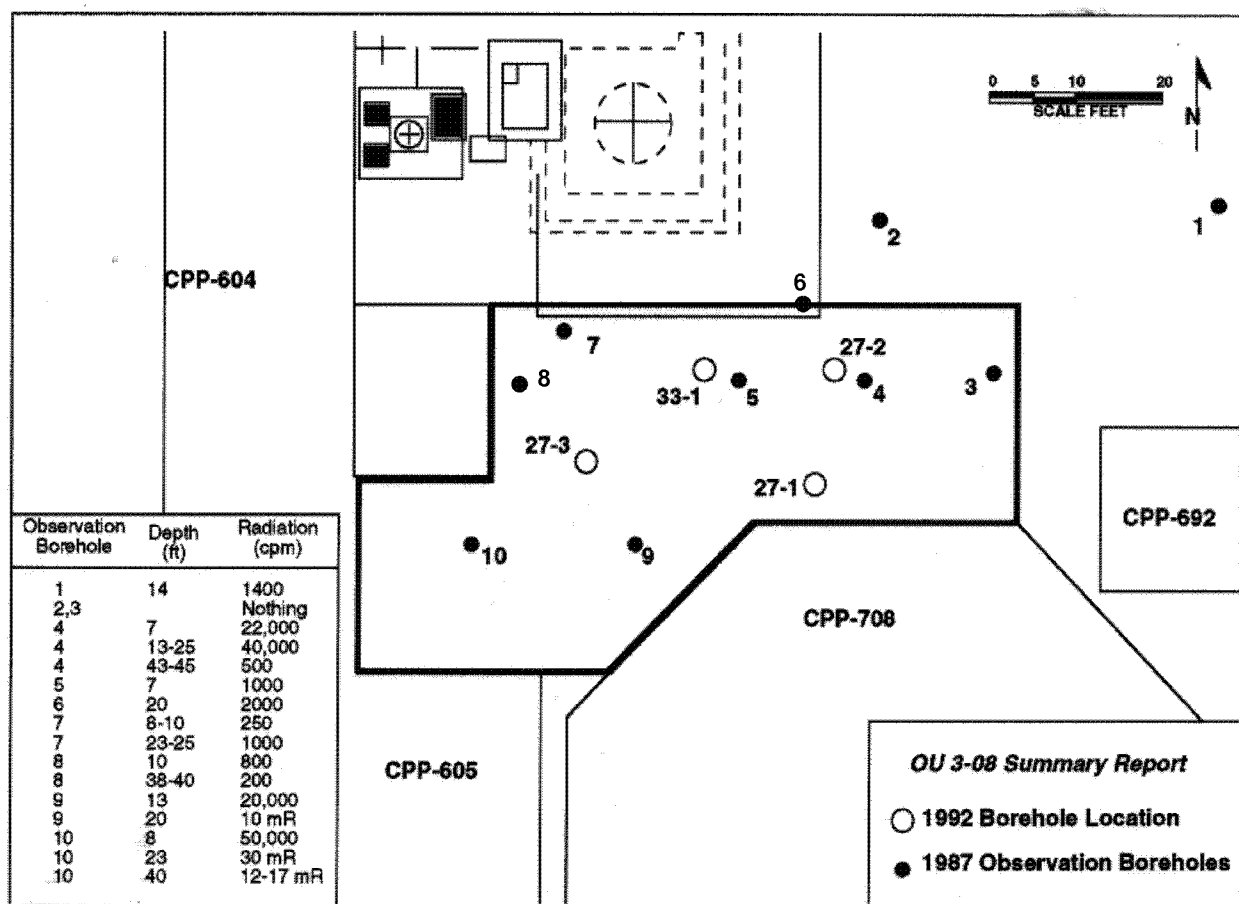


Figure 3-30. Map of site CPP-27 showing the locations of previously drilled boreholes.

Table 3-7. Radionuclide sample analytical results for borehole CPP-33-1.

Borehole	Depth (feet)	Am-241 (pCi/g)	Sb-125 (pCi/g)	Ce-144 (pCi/g)	Cs-134 (pCi/g)	Cs-137 (pCi/g)	Co-58 (pCi/g)	Co-60 (pCi/g)	I-129 (pCi/g)	Np-237 (pCi/g)
CPP-33-1	1	2.04 ± 0.87	0.03 U	0.05 U	0.08 U	0.03 U	0.09 U	0.07 U	0.5 U	0.4 U
	3	0.05 U	0.03 U	0.05 U	0.08 U	0.40 U	0.09 U	0.07 U	0.5 U	0.5 U
	5	2.91 ± 2.02	0.03 U	0.05 U	0.08 U	0.40 U	0.09 U	0.07 U	0.5 U	0.5 U
	7	0.05 U	0.03 U	0.05 U	0.08 U	306 ± 4	0.09 U	0.07 U	0.5 U	0.5 U
	9	0.05 U	0.03 U	0.05 U	0.08 U	254 ± 3	0.09 U	0.07 U	0.5 U	0.5 U
	11	9.59 ± 1.59	0.03 U	0.05 U	0.08 U	53.0 ± 1.8	0.09 U	0.07 U	0.5 U	0.5 U
	17	0.05 U	0.03 U	0.05 U	0.08 U	219 ± 3	0.09 U	0.07 U	0.5 U	0.5 U
	21	0.05 U	0.03 U	0.05 U	0.08 U	416 ± 4	0.09 U	0.07 U	0.5 U	0.5 U
	25	0.05 U	0.03 U	0.05 U	0.08 U	606 ± 3	0.09 U	0.07 U	0.5 U	0.5 U
	29	0.05 U	0.03 U	0.05 U	0.08 U	298 ± 2	0.09 U	0.07 U	0.5 U	0.8 U
	33	0.05 U	0.03 U	0.05 U	0.08 U	10.3 ± 0.4	0.09 U	0.07 U	0.5 U	0.5 U
	37	0.05 U	0.03 U	0.05 U	0.08 U	121 ± 1	0.09 U	0.07 U	0.5 U	1.14 ± 0.60
	39	0.05 U	0.03 U	0.05 U	0.08 U	0.42 ± 0.07	0.09 U	0.07 U	0.5 U	0.5 U
	41	0.05 U	0.03 U	0.05 U	0.08 U	0.12 ± 0.07	0.09 U	0.07 U	0.5 U	0.68 ± 0.27
45	0.39 ± 0.24	0.03 U	0.05 U	0.08 U	2.37 ± 0.15	0.09 U	0.07 U	0.5 U	0.6 U	
47	0.05 U	0.03 U	0.05 U	0.08 U	2.13 ± 0.07	0.09 U	0.07 U	0.5 U	0.3 U	
112	0.05 U	0.03 U	0.05 U	0.08 U	0.04 U	0.09 U	0.07 U	0.5 U	0.38 ± 0.17	
113	0.05 U	0.03 U	0.05 U	0.08 U	0.08 U	0.09 U	0.07 U	0.5 U	0.4 U	
Borehole	Depth (feet)	Pu-239/240 (pCi/g)	Pu-238 (pCi/g)	Ru-103 (pCi/g)	Ru-106 (pCi/g)	Sr-90 (pCi/g)	U-234 (pCi/g)		U-235 (pCi/g)	U-238 (pCi/g)
CPP-33-1	1	0.34 ± 0.12	0.46 ± 0.12	0.2 U	0.07 U	2.87 ± 0.20	0.09 ± 0.02		0.05 U	0.09 ± 0.03
	3	0.05 U	0.05 U	0.2 U	0.07 U	0.36 ± 0.10	0.15 ± 0.05		0.05 U	0.13 ± 0.04
	5	0.05 U	0.06 ± 0.04	0.2 U	0.07 U	1.63 ± 0.15	0.10 ± 0.02		0.05 U	0.10 ± 0.02
	7	0.05 U	0.05 U	0.2 U	0.07 U	102 ± 1.1	0.12 ± 0.03		0.05 U	0.09 ± 0.03
	9	0.05 U	0.08 ± 0.05	0.2 U	0.07 U	281.7 ± 1.8	0.12 ± 0.03		0.05 U	0.09 ± 0.02
	11	0.05 U	0.05 U	0.2 U	0.07 U	47.68 ± 0.74	0.08 ± 0.03		0.05 U	0.08 ± 0.03
	17	0.05 U	0.05 U	0.2 U	0.07 U	328.8 ± 1.8	0.10 ± 0.03		0.05 U	0.13 ± 0.04
	21	0.05 U	0.05 U	0.2 U	0.07 U	294.7 ± 1.7	0.16 ± 0.04		0.05 U	0.10 ± 0.03
	25	0.05 U	0.05 U	0.2 U	0.07 U	163.5 ± 1.3	0.13 ± 0.02		0.05 U	0.11 ± 0.02
	29	0.05 U	0.05 U	0.2 U	0.07 U	108.4 ± 1.1	0.12 ± 0.04		0.05 U	0.13 ± 0.04
	33	0.05 U	0.05 U	0.2 U	0.07 U	6.0 ± 0.3	0.18 ± 0.04		0.05 U	0.26 ± 0.04
	37	0.05 U	0.05 U	0.2 U	0.07 U	47.9 ± 0.7	0.05U		0.05 U	0.05U
	39	0.05 U	0.05 U	0.2 U	0.07 U	0.87 ± 0.12	0.28 ± 0.09		0.05 U	0.30 ± 0.09
	41	0.05 U	0.05 U	0.2 U	0.07 U	0.39 ± 0.11	0.32 ± 0.04		0.05 U	0.54 ± 0.05
	45	0.05 U	0.05 U	0.2 U	0.07 U	2.5 ± 0.2	0.17 ± 0.03		0.05 U	0.18 ± 0.04
47	0.05 U	0.05 U	0.2 U	0.07 U	0.10 U	0.51 ± 0.19		0.05 U	0.63 ± 0.20	
112	0.05 U	0.05 U	0.2 U	0.07 U	0.16 ± 0.08	0.07 ± 0.01		0.05 U	0.05 ± 0.01	
113	0.05 U	0.05 U	0.2 U	0.07 U	0.18 ± 0.08	0.20 ± 0.02		0.05 U	0.19 ± 0.02	

U: Indicates the compound was analyzed for but not detected. The reported value is the sample analysis limit.

U—Indicates the compound was analyzed for but not detected. The reported value is the sample quantitation limit.

Sites CPP-27 and -33 were additionally characterized as part of the OU 3-08 Track 2 investigation in 1992 (WINCO 1993b). Three boreholes labeled CPP-27-1, CPP-27-2, and CPP-27-3 were made at the site (see Figure 3-30). Borehole CPP-27-1 was drilled to 46 ft bgs, and the other two boreholes were drilled to 12 ft bgs. Twenty soil samples were collected and analyzed for VOCs, metals, selected anions, pH, and radionuclides. The selection of the appropriate depths to collect the soil samples from each borehole was based on the highest measured radiation reading on soil collected as the borehole was drilled. Sixteen of 20 samples analyzed by gamma spectroscopy had Cs-137 activities above the expected background level of 0.82 pCi/g (INEL 1996). Elevated Cs-137 was measured in borehole CPP-27-1 at depths from 2 to 22.5 ft bgs, in borehole CPP-27-2 at depths from 4 ft to 10 ft bgs, and in borehole CPP-27-3 at depths from 4 to 6 ft bgs. Slightly elevated alpha activities were found in boreholes CPP-27-1 and CPP-27-3 at depths from 6 to 16 ft bgs and 4 to 12 ft bgs, respectively. Analytical results for the soil samples collected from the three boreholes are presented in Table 3-8.

The subsurface radiation levels measured in 1987 from boreholes CPP-27-1 through CPP-27-3 and from CPP-33-1 were evaluated to estimate the extent of residual contamination at this site. On the basis of the 1987 subsurface radiation profiles, most of the contamination appears to be located in the southwest portion of the site, where radiation levels as high as 30 mR/hr were measured below a depth of 20 ft (WINCO 1993b). The contamination detected in boreholes #9 and #10 is likely to have originated from the 12-in., carbon-steel, pressure-relief line. The contamination may have followed the stack condensate drain line that is buried near the borehole #10. Depth of the line is approximately 10 ft below land surface.

The contamination detected in boreholes #5, #7, #8, and CPP-27-2 is likely related to the contaminated soil that was used as backfill. The contamination detected in CPP-33-1 and borehole #4 at depths greater than about 7 ft is probably not associated with contaminated backfill. The two holes fall within the outline of the 1983 excavation, but the excavation in that area was relatively shallow (approximately 6 to 7 ft), based on photographs of the construction.

The source of the contamination detected in boreholes CPP-27-1, and the deeper portions of CPP-33-1 and #4, is not clear. These boreholes encountered contamination in unexcavated zones at depths above the reported release. The contamination observed might be from stack condensate that was known to seep through cracks and joints in the INTEC stack when the stack condensate drain was not functioning or could be from other yet-to-be-identified releases from waste handling piping in the vicinity (Figure 3-29).

After further investigation of this site, process knowledge may be able to be used to establish a source term. The appropriate radionuclide ratios will be applied to the waste stream(s), recognizing that any waste undergoing an evaporation process will have different radionuclide ratios than untreated waste.

The northern and eastern limits of the contamination associated with the CPP-27 release zone appear to be bounded by the 1983 excavation, as determined by the lack of radioactivity detected in boreholes #2 and #3, and low levels of radioactivity detected in borehole #6. These boreholes were drilled in or near the excavated area.

The subsurface radiation profiles indicate that low levels of beta-gamma contamination are present at depths typically greater than 7 ft bgs. Levels of beta-gamma radiation below background were again encountered at depths greater than 20 ft bgs and continued to the top of the basalt for CPP-27-1; levels of beta-gamma radiation below background were also encountered at depths greater than 38 ft and continued to the top of the basalt in borehole CPP-33-1. From the 1987 data, however, higher levels of beta-gamma radiation were measured at the bottom of the boreholes located in the southwest portion of the site (boreholes #9 and #10). Whether the contamination continues below this depth is uncertain, since the depths of the boreholes installed in 1987 were not reported.

Table 3-8. Analytical results for the soil samples collected at CPP-27-1, 27-2, and 27-3.

Borehole	CPP-27-1		CPP-27-1		CPP-27-1		CPP-27-1		CPP-27-1		CPP-27-1	
Depth (feet)	2 – 4		6 – 8		8 – 10		10 – 12		12 – 16		12 – 16 (Duplicate)	
Sample Number	30800101		30800201		30800301		30800401		30800501		30801101	
Chemical Parameters												
Mercury	0.06		B	0.14			B	0.14			0.33	0.24
Cadmium	1.10		U	1.10		U	U	1.10		U	1.10	U
Fluoride	1.17		J	1.15		J	J	1.68		J	1.83	J
pH	8.88			9.11				9.03			9.08	8.95
Nitrate	0.93		J	0.57		J	J	2.20		J	3.60	J
Nitrite	0.22		UJ	0.21		UJ	UJ	0.22		UJ	0.22	UJ
Radionuclides												
Gross Alpha	1.12E+01 ± 1.74E+00											
Gross Beta	2.82E+01 ± 2.52E+00											
Cs-137	4.52E+00 ± 3.81E-01											
Eu-154	ND											
K-40	1.97E+01 ± 9.37E-01											
Sr-90	NA											
U-234	NA											
U-235	NA											
U-238	NA											
Pu-238	NA											
Pu-239	NA											
Am-241	NA											
Borehole	CPP-27-1		CPP-27-1		CPP-27-1		CPP-27-1		CPP-27-2		CPP-27-2	
Depth (feet)	21 – 22.5		32 – 33.2		40 – 41.7		44 – 45.3		4 – 6		4 – 6 (Duplicate)	
Sample Number	30800601		30800701		30800801		30800901		30801201		30801601	
Chemical Parameters												
Mercury	0.27			0.05		U	U	0.06		U	0.05	B
Cadmium	1.10		U	1.10		U	U	1.20		U	1.10	U
Fluoride	1.10		J	1.52		J	J	5.48		J	1.03	J
pH	9.13			7.74				8.16			8.79	9.19
Nitrate	0.21		UJ	0.62		J	J	1.40		J	1.10	J
Nitrite	0.21		UJ	0.21		UJ	UJ	0.25		UJ	0.21	UJ
Radionuclides												
Gross Alpha	1.11E+01 ± 1.70+00											
Gross Beta	6.13E+01 ± 4.44E+00											
Cs-137	1.35E+01 ± 9.14E-01											
Eu-154	ND											
K-40	2.11E+01 ± 1.02E+00											
Sr-90	8.54E+00 ± 1.04E+00											
U-234	NA											
U-235	NA											
U-238	NA											
Pu-238	NA											
Pu-239	NA											
Am-241	NA											

Table 3-8. (continued).

Borehole	CPP-27-2			CPP-27-2			CPP-27-3			CPP-27-3			CPP-27-3		
Depth (feet)	6 – 8			8 – 10			10 – 12			2 – 4			4 – 6		
Sample Number	30801301			30801401			30801501			30801701			30801801		
Chemical Parameters	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	
	Mercury	0.05	B	0.05	U	0.05	U	0.06	U	0.08	B	0.05	U		
	Cadmium	1.10	U	1.70	U	1.10	U	1.10	U	1.10	U	1.10	U	U	
	Fluoride	1.26	J	1.22	J	0.75	J	6.72	J	1.41	J	1.02	J	J	
	pH	8.84		8.95		8.80		9.25		9.13		9.15			
	Nitrate	1.10	J	0.38	J	0.65	J	0.21	J	0.21	UJ	0.46	J	J	
	Nitrite	0.21	UJ	0.21	UJ	0.21	UJ	0.21	UJ	0.22	UJ	0.22	UJ	UJ	
	Radionuclides	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	
Gross Alpha	1.67E+01 ± 2.33E+00		1.98E+01 ± 2.69E+00		1.00E+01 ± 1.60E+00		6.96E+00 ± 1.13E+00	J	4.60E+01 ± 5.83E+00	J	3.31E+01 ± 4.40E+00	J	3.31E+01 ± 4.40E+00		
Gross Beta	1.90E+02 ± 1.58E+01		2.55E+02 ± 2.08E+01		2.74E+01 ± 2.46E+00		2.64E+01 ± 2.36E+00		6.88E+02 ± 5.54E+01		2.96E+02 ± 2.41E+01		2.96E+02 ± 2.41E+01		
Cs-137	5.31E-01 ± 3.61E+00		5.40E+01 ± 3.88E+00		1.08E+00 ± 8.07E-02		7.39E-01 ± 5.68E-02		1.63E+02 ± 1.24E+01		4.81E+01 ± 3.52E+00		4.81E+01 ± 3.52E+00		
Eu-154	ND		ND		ND		ND		3.86E-01 ± 7.00E-02		ND		ND		
K-40	1.74E+01 ± 1.05E+00		1.93E+01 ± 1.00E+00		1.98E+01 ± 1.09E+00		2.18E+01 ± 1.04E+00		2.20E+01 ± 1.19E+00		1.99E+01 ± 1.17E+00		1.99E+01 ± 1.17E+00		
Sr-90	7.05E+01 ± 4.41E+00		8.50E+01 ± 4.70E+00		NA		NA		2.52E+02 ± 1.02E+01		4.70E+01 ± 3.44E+00		4.70E+01 ± 3.44E+00		
U-234	NA		NA		NA		NA		1.22E+00 ± 7.96E-02		1.10E+00 ± 6.97E-02		1.10E+00 ± 6.97E-02		
U-235	NA		NA		NA	U	NA	U	6.75E-02 ± 1.62E-02		6.90E-02 ± 1.50E-02		6.90E-02 ± 1.50E-02		
U-238	NA		NA		NA		NA		1.16E+00 ± 7.71E-02		1.17E+00 ± 7.24E-02		1.17E+00 ± 7.24E-02		
Pu-238	NA		NA		NA		NA		7.76E-01 ± 6.26E-02		1.11E-01 ± 2.08E-02		1.11E-01 ± 2.08E-02		
Pu-239	NA		NA		NA		NA		2.91E-01 ± 3.58E-02		2.58E-02 ± 9.80E-03		2.58E-02 ± 9.80E-03		
Am-241	NA		NA		NA		NA	J	2.12E-01 ± 6.76E-02	J	1.39E-01 ± 4.22E-02		1.39E-01 ± 4.22E-02		
Borehole	CPP-27-3			CPP-27-3											
Depth (feet)	6 – 8 (Duplicate)			10 – 12											
Sample Number	30802101			30802001											
Chemical Parameters	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	
	Mercury	0.05	B	0.06	U			U							
	Cadmium	1.10	U	1.10	U			U							
	Fluoride	0.92	J	1.65	J			J							
	pH	9.20		8.87											
	Nitrate	0.56	J	0.45	J			J							
	Nitrite	0.21	UJ	0.22	UJ			UJ							
	Radionuclides	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	Q	Concentration (mg/kg or pCi/g)	
Gross Alpha	1.56E+01 ± 2.19E+00	J	2.31E+01 ± 3.00+00	J			J								
Gross Beta	1.80E+02 ± 1.48E+01		5.19E+02 ± 4.19E+01												
Cs-137	5.57E+01 ± 4.70E+00		3.60E+00 ± 3.03E-01												
Eu-154	ND		ND												
K-40	1.94E+01 ± 1.03E+00		1.89E+01 ± 9.00E-01												
Sr-90	6.97E+01 ± 3.98E+00		2.34E+02 ± 1.00E+01												
U-234	NA		1.08E+00 ± 7.68E-02												
U-235	NA		3.36E-02 ± 1.20E-02	U											
U-238	NA		9.57E-01 ± 7.12E-02												
Pu-238	NA		2.99E-02 ± 1.23E-02	U											
Pu-239	NA		3.49E-02 ± 1.33E-02	U											
Am-241	NA		1.18E-01 ± 3.43E-02												
U – Indicates the compound was analyzed for but not detected. The reported value is the sample quantitation limit UJ – Indicates the compound was analyzed for but not detected and the reported value is an estimate of the sample quantitation limit. J – Indicates the value reported is an estimate. B – Indicates the value reported is less than the contract required quantitation limit but greater than the instrument detection limit. NA – not applicable. ND – not detected. Q – qualifier.															

The extent of soil contamination at this site generally appears to be limited to the north and east by the 1983 excavations and borings TFR-3, A-62, and A-63; to the west by building CPP-604; and to the south by building CPP-605 and the INTEC stack (CPP-708). Soil boring TFR-3, located approximately 55 ft northwest of the CPP-27/33 release point, which was completed to 14.25 ft bgs, did not encounter contaminated soils during drilling and sampling in the field. Because this boring was shallow, it probably encountered 1983 excavation backfill. This suggests that the backfill used in this area was clean. A-62 and A-63 (see Figure 3-20) were both drilled to basalt and encountered little to no contamination below 4.0 ft. Some surficial contamination was detected in the 2-4-ft sample collected in A-62, which was likely associated with contamination associated with general operations.

To estimate the Cs-137 and Sr-90 activity still remaining at the CPP-27/33 release site, soil analytical data were used because process knowledge does not list and waste streams are not known. The total area of CPP-27 (2,000 ft²) was multiplied by a depth of 25 ft, resulting in a volume of 50,000 ft³. Using an average Cs-137 activity of 214 pCi/g from soil analytical data results in a total Cs-137 activity of 0.6 Ci. Adding an equal amount of Sr-90 activity results in a total Cs-137 and Sr-90 activity of 1.2 Ci.

Contamination at CPP-33 was assumed to have been removed, but some contamination in the backfill may have been present and can be estimated. The surface area of CPP-33 is 1,200 ft² (40 × 30 ft). Assuming a soil thickness of 30 ft (to the top of the WL-133 tank vault), the volume equals 36,000 ft³. Using the upper Cs-137 concentration of 114 pCi/g, based on soil analytical data for soils excavated during the 1993 to 1995 tank farm upgrade (DOE-ID 1997a), the total Cs-137 activity for the backfilled soil would be 0.233 Ci. Using the upper Sr-90 analytical result of 330 pCi/g results in a Sr-90 activity of 0.67 Ci. Combining the two results in a total Cs-137 and Sr-90 activity of 0.91 Ci.

Because the source of the contamination is not entirely understood for this site, the use of radionuclide ratios to establish a radionuclide source term may not be appropriate. The volume released to the environment and the type of waste (unevaporated or evaporative waste stream) are unknown. Also, Cs-137 will be strongly absorbed at the release site and more will accumulate the longer a release occurs. For these reasons, estimating the more mobile isotopes based on the Cs-137 concentrations found in the soils at site CPP-27/33 may not be possible.

3.1.6 Site CPP-26

On the morning of May 10, 1964, preparations were made to steam and purge tank farm waste lines PUA-1220, -1222, and -1223 to reduce internal contamination preparatory to connecting these lines to piping associated with then-new 300,000-gal waste tanks WM-189 and -190 (Figure 3-31). A steam line was run from building CPP-635 to a decontamination header riser. Associated valves on the waste lines were then identified and positioned per the operation checklist to purge line PUA-1223 and the connecting lines to tank WM-186. Valve 86 on PUA-1223 appeared to be “frozen” shut, so the decision was made to use steam to purge line PUA-1222 and its connecting line to WM-186. The necessary valve changes were made to steam the new line.

Steam was then directed into the steam supply line, allowing pressure to build to 35 pounds per square inch (psi). At that point, the steam was shut in via a control valve. Valve DCV-109 was then opened on the decontamination header, allowing steam to enter the waste line and lowering the line steam pressure. The steam supply valve was then opened and allowed to pressure up to 35 psi. The steam line and aboveground lines were checked visually, and no problems were detected. During the visual check, the steam pressure rose to 75 psi. The steam valve was throttled back until the pressures returned to 35 psi and stabilized. After approximately 10 minutes, tank farm personnel noticed that the pressure had risen to 140 psi. The steam valve was shut off, and the pressure slowly dropped to 80 psi. Steam pressure was then slowly increased, and an additional check was made to verify that all valves were open.

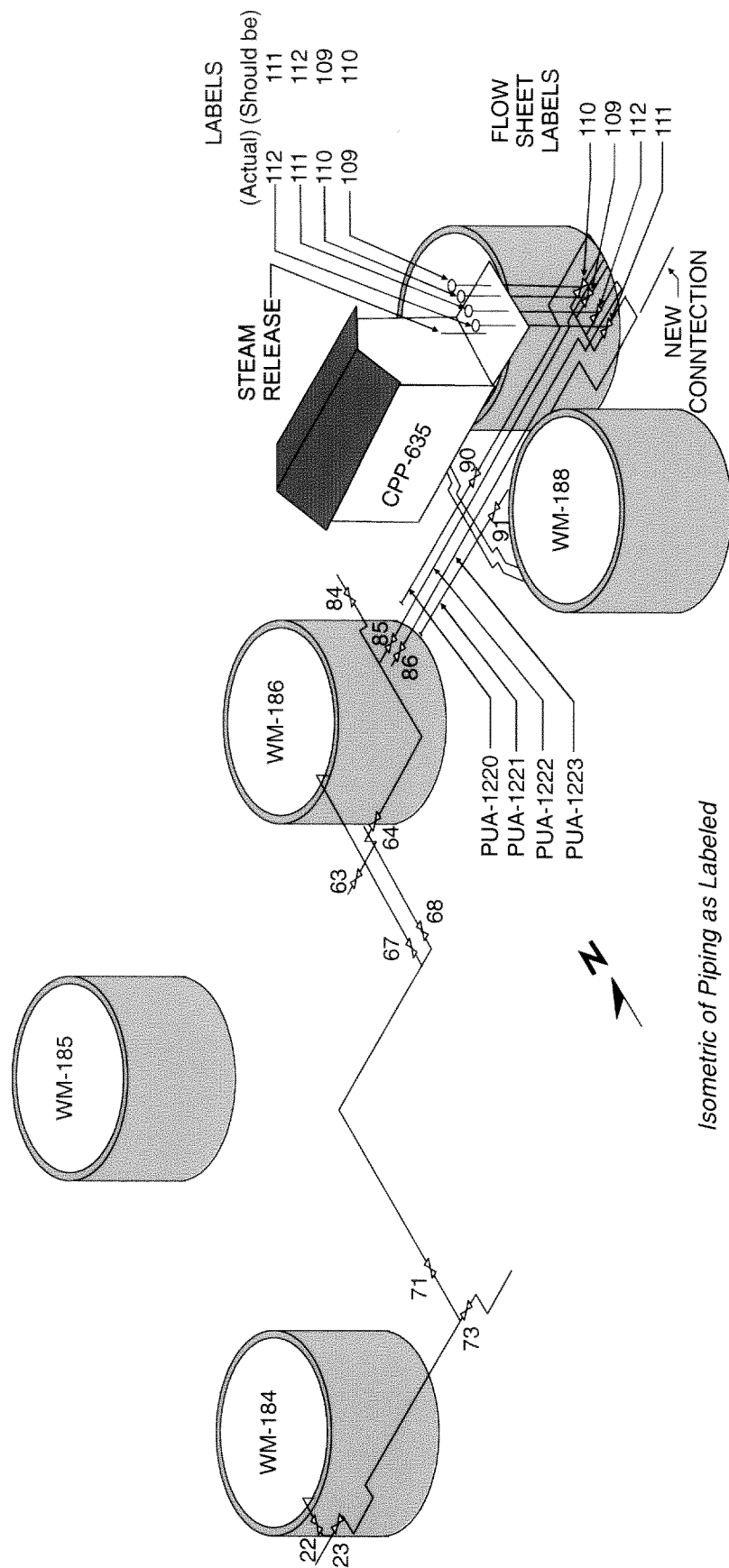


Figure 3-31. Isometric view of piping associated with the CPP-26 steam release.

Concurrently, a steam leak was observed at a hose coupling that connected the steam line to the decontamination header. Radiation-detection instrumentation showed that the spray coming from the steam hose coupling was radioactive.

To release pressure on the line, the proper valve configuration was identified and positioned, allowing the line to vent to WM-184. Once the pressure was released, tank farm personnel were able to approach the steam release site and close valve DCV-109 on the decontamination header. Liquid was reported dripping from the failed coupling for several hours.

The subsequent investigation revealed that the valves on the decontamination header were incorrectly tagged. As a consequence, steam had been applied to blocked line PUA-1220 through valve DCV-110 instead of PUA-1222 through valve DCV-109, as intended. No leak was noticed in the hose coupling when it was initially pressurized, indicating that it failed sometime after line decontamination operations began. After the incident, portions of the seat and collar of the coupling were found to be badly damaged.

The wind at the time of the release accounted for the large area of contamination. Meteorological data for the day from the U.S. Weather Bureau documented that the instantaneous wind at 11:45 a.m. was from 246° at 27 mph. The mean wind from 11:00 a.m. to 2:00 p.m. was from 244° at 30 mph. Fluctuations in the wind from 11:45 a.m. to 2:00 p.m. varied over a 78° sector from 237° to 315° (U.S. Weather Bureau 1964).

A maximum volume of first-cycle waste contained in the 3-in. line was calculated to be 15 gal, based on the length of the piping run and the slope of the pipe. The slope of the pipe was to the east, causing the first-cycle waste to accumulate in the eastern portion of the pipe. When the steam pressure blew the steam coupling, the liquid waste was forced up the decontamination line and released to the environment, most likely as a combination of liquid and steam. On the basis of an analysis of first-cycle tank waste in 1964, the total Cs-137 and Sr-90 activity of the waste in the line was estimated to be 8 Ci/gal. A sample of waste from WM-187 was collected in March 1964 and analyzed for Cs-137 and Sr-90. The analytical results for the sample found the concentrations of Cs-137 and Sr-90 to be nearly equal in concentration. Cs-137 and Sr-90 concentrations were measured at 1.09 Ci/L and 1.03 Ci/L, respectively. Multiplying the upper limit waste volume by the curie content results in a value of 120 Ci, which provides an upper limit to the total Cs-137 and Sr-90 curies that may have been released.

The weather conditions at the time of the release, as described above, included high winds, which resulted in a cloud of steam contaminating an estimated 13 acres to the northeast of the release location. Ten acres were outside the INTEC security fence present at that time. Currently, only about 1 acre of the original 13 acres is outside the INTEC facility fence (see Figures 3-32 and 3-33). While the areal extent of contamination is large, the area under investigation in the OU 3-14 RI/FS Work Plan includes only the portion of the CPP-26 release site that lies within the tank farm fence.

The steam release occurred during the construction of the last two storage tanks, WM-189 and WM-190. The existence of surficial contamination from the release posed an exposure risk to construction workers working inside the tank farm security fence. This risk was mitigated by wetting down the area where the release occurred. Lawn sprinklers were reported to have been used to wet the area for 1 to 2 days, after which construction activities resumed.

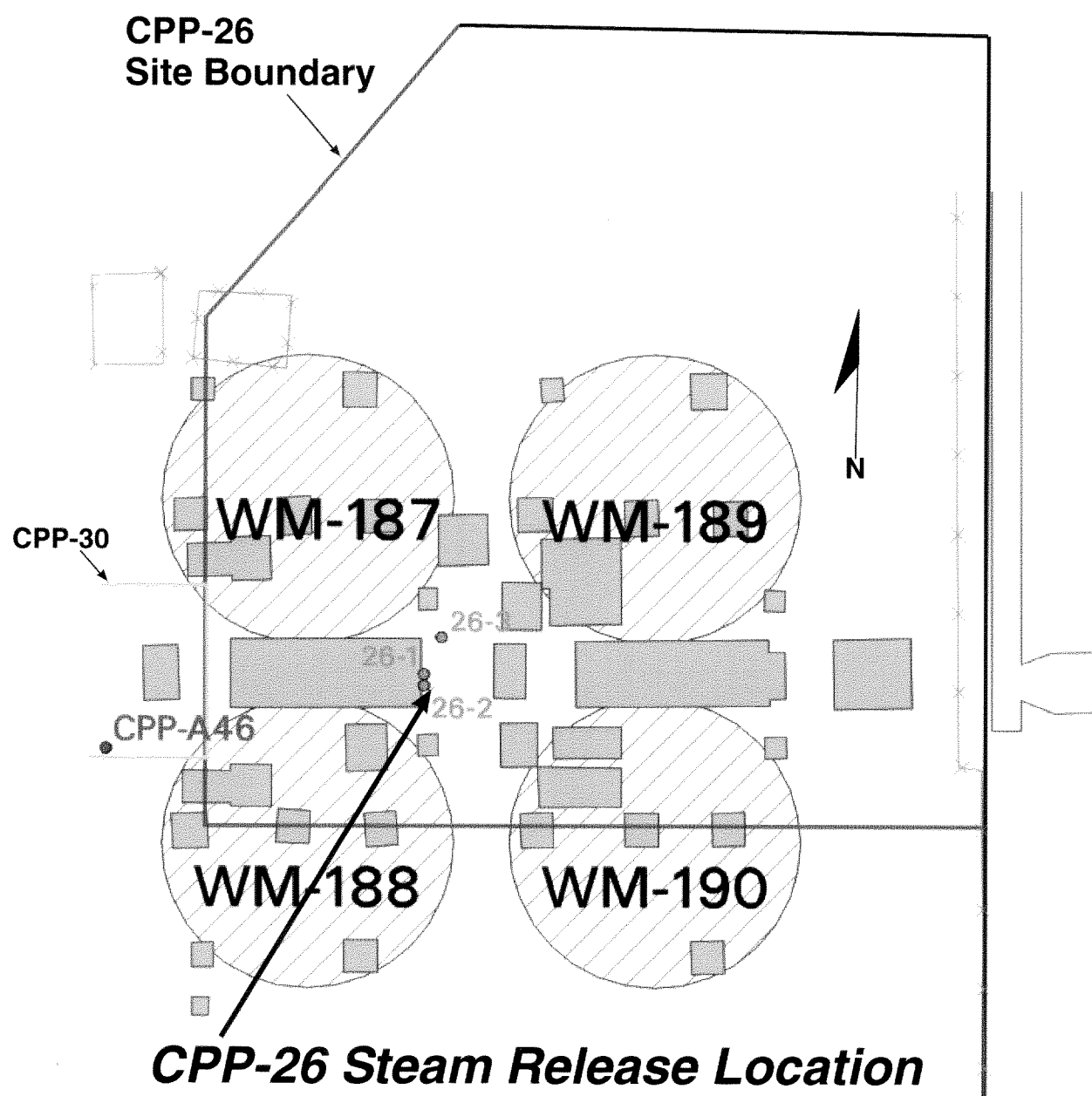


Figure 3-32. Location of the existing boreholes at site CPP-26.

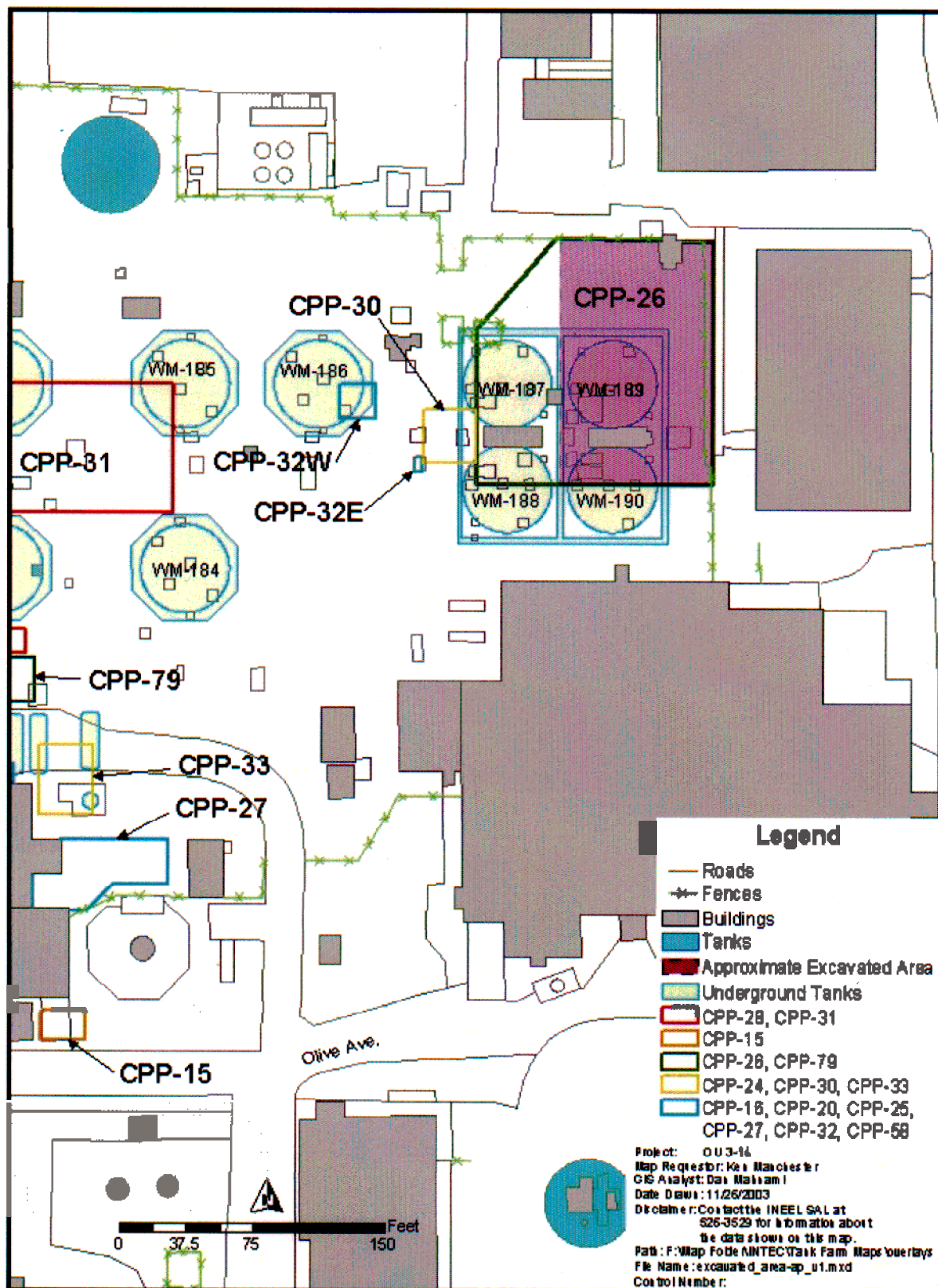


Figure 3-33. Location of the excavated area within site CPP-26.

After the release, a sample of mud was collected near the decontamination header. The mud was found to contain 520 pCi/g of Cs-137, 3.3 pCi/g of Cs-134, 22,400 pCi/g of Ce-144, 3,600 pCi/g of Ru-106, 810 pCi/g of Ru-103, and 0.03 pCi/g of Pu-242. Reportedly, the liquid present near the header was cleaned up, solidified, and sent to the RWMC for disposal. A surface radiation survey after the 1964 incident detected between 2 and 10 mR/hr in the soil, with one area as high as 200 mR/hr of gross radiation.

The entire CPP-26 site has been disturbed extensively since the release. A portion of the release site nearest to the decontamination header was excavated during the construction of buildings CPP-699 and CPP-654 and Bin Sets 4, 5, and 6 at the CSSF. Any remaining contamination from the release that is within the current tank farm boundaries has been covered with 2 ft of soil, a 20-mil-thick membrane liner, and an additional 6 in. of soil to prevent the liner from blowing away. Therefore, the contamination from the steam release would be expected to be approximately 2.5 ft bgs in the tank farm area.

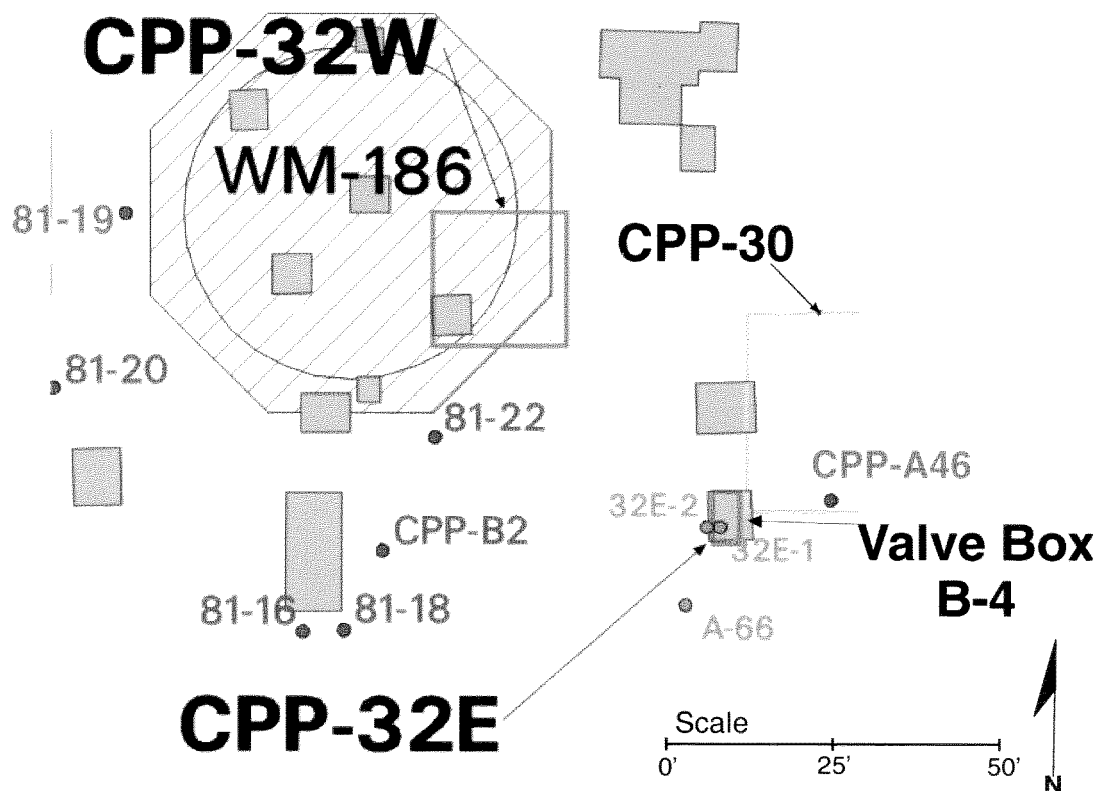
In 1991, a surface radiation survey of the area was performed. No elevated beta/gamma radiation was detected on the surface outside of the tank farm on areas undisturbed since the steam release incident. Site CPP-26 was characterized as part of the OU 3-07 Track 2 investigation in 1992 (WINCO 1993a). A stainless-steel hand auger was used to drill three boreholes in the tank farm soil near the location of the steam release to determine the nature and extent of residual contamination. These three boreholes were located to the east and northeast of building CPP-635 (Figure 3-32). Two boreholes were drilled to approximately 6 ft below the tank farm liner; the third borehole was abandoned at 4 ft below the liner because of the presence of concrete. Nine soil samples, including three duplicate samples, were collected from the three boreholes. The selection of the appropriate depths to collect the soil samples from the boreholes was based on the highest measured radiation reading on soil collected as the borehole was drilled. The collected samples were analyzed for VOCs, selected metals, fluoride, nitrate, nitrite, pH, and radionuclides. The analytical results of the soil samples are presented in Table 3-9.

The radionuclides detected in the soil during the Track 2 investigation consist primarily of Sr-90, Cs-137, Eu-154, and lower levels of Pu-238, Pu-239, and Am-241. The highest concentrations (Sr-90 up to 15,800 pCi/g and Cs-137 ranging from 108 ± 9.08 to $6,460 \pm 465$ pCi/g) were measured in samples collected between 4 and 5 ft bgs (WINCO 1993a). The radionuclide distribution observed in the soils may be attributed to the use of sprinklers wetting down the area after the steam release. The higher Sr-90 concentrations are likely the result of its higher mobility in soils.

A source term for this release can be determined by using the volume (15 gal) of first-cycle waste that could have been released after the steam line coupling failed. Applying appropriate radionuclide ratios to the Cs-137 concentration in the waste liquid will facilitate the development of a source term for this release.

3.1.7 Site CPP-32

Sites CPP-32E (east) and -32W (west) are two areas of localized contamination near valve box B-4 (Figure 3-34). The contamination at CPP-32E (southwest of valve box B-4) appears to have originated from the condensation of contaminated water vapor in valve box B-4 that was released to the ground surface from the standpipe (air vent tube and view port pipe), which extends out of the valve box. This area is approximately 8 ft² and extends to a depth of about 1 ft bgs.



CPP-32 East and West Release Sites

Figure 3-34. CPP-32 east and west release sites.

Site CPP-32W is approximately 50 ft northwest of valve box B-4, and the source of the release is believed to be a result of a leak of radioactive liquid from a 2-in.-diameter aboveground carbon-steel transfer line that was temporarily used to pump water from tank vault sumps to the PEW evaporator. This area is approximately 6 ft², but the depth of contamination was not determined. Both sites were identified in December 1976 and described as having surface radiation levels up to 2 R/hr. No formal documentation was found describing cleanup of the sites after they were identified in 1976. However, standard tank farm practice would have been to remove the contaminated soil. Because the amount of contaminated soil was relatively small, no records were likely kept. Both of these surface releases have since been covered with 2.5 ft of soil and the tank farm membrane, which was installed in 1977.

3.1.7.1 Site CPP-32W. The contamination existing at CPP-32E is due to the frequent use of valve box B-4. Waste transfers from CPP-601 to tanks WM-187, -188, and -189 had to pass through B-4. In addition, liquid waste transfers to the WCF from the entire tank farm complex routinely passed through B-4, making it one of the most frequently used valve boxes in the tank farm. Typically, steam jetting was used to transfer the waste, which created thermally hot solutions that passed through the valve box. The frequent use of B-4 caused some wear to the valve assembly, which allowed minor leakage to occur. Any leakage from the valve was contained in the valve box and drained to tank vault sumps. The minor leakage within the valve box likely generated steam within the box, some of which passed through the air vent tube, condensed, and dripped on the ground.

During the OU 3-07 Track 2 investigation in 1992 (WINCO 1993a), soil samples from site CPP-32E were collected from a single soil boring. The borehole was drilled adjacent to the vent tube until a concrete valve box was encountered at a depth of 5 ft.

During field screening, the highest beta/gamma radiation reading, 900 cpm above background, was detected between 1.4 and 2.9 ft below the membrane, which is about 2.5 ft below the current ground surface. This depth is roughly equivalent to the ground surface at the time of the release. These low contamination levels support the idea that the contaminated soil was removed when it was initially discovered in 1976. At the bottom of the borehole, the beta-gamma radiation had decreased to 250 cpm above background. On the basis of the field radiation measurements, one soil sample was collected at a depth of 1.4 to 2.3 ft and two soil samples were collected at a depth of 2.2 to 2.9 ft below the membrane. The samples were analyzed for VOCs, two metals (mercury and cadmium), gamma-emitting radionuclides, gross alpha and gross beta radiation, and Sr-90. Sample results are presented in Table 3-10.

Table 3-10. Analytical results for soil samples collected at site CPP-32E.

Borehole	CPP-32E-1				CPP-32E-1				CPP-32E-1			
Depth (feet)	1.4 – 2.3				2.2 – 2.9				2.2-2.9 (Duplicate)			
Sample Number	30701001				30701101				30701201			
Chemical Parameters	Concentration mg/kg or pCi/g			Q	Concentration mg/kg or pCi/g			Q	Concentration mg/kg or pCi/g			Q
Toluene	0.001			J	0.001			J	0.001			J
Mercury	0.22				0.3				0.16			
pH	9.27				9.26				9.36			
Radionuclides	Uncertainty				Uncertainty				Uncertainty			
Gross Alpha	19.6	±	2.63	J	21.5	±	2.97		14.8	±	2.1	
Gross Beta	724	±	58.6		358	±	29.2		350	±	28.7	
Cs-137	277	±	21.1	J	151	±	12.7		133	±	11.2	
Eu-154	0.45	±	0.066	J	0.81	±	0.092		0.54	±	0.076	
K-40	18.6	±	0.99	J	18.7	±	1.12		21.0	±	1.13	
Sr-90	278	±	14.6	J	152	±	9.56		244	±	14.1	
U-234	NA				NA				NA			
U-235	NA				NA				NA			
U-238	NA				NA				NA			
Pu-238	NA				NA				NA			
Pu-239	NA				NA				NA			
Pu-242	NA				NA				NA			
Am-241	NA				NA				NA			
J – Estimated concentration (below method detection level).												
NA – Not analyzed.												
Q – Qualifier.												

The gross alpha concentrations from the three samples ranged from 14.8 to 21.5 pCi/g and were within normal background concentrations. Therefore, no isotopic analysis of the alpha-emitting radionuclides was performed. The gross beta concentrations from the three samples ranged from 350 to 724 pCi/g, and the subsequent isotopic analysis of Sr-90 ranged from 153 to 278 pCi/g. Of the man-made gamma-emitting radionuclides, only Cs-137, at concentrations ranging from 133 to 277 pCi/g, and Eu-154, at concentrations ranging from 0.456 to 0.811 pCi/g, were detected.

The installation of A-66 southwest of the valve box helped to bound the contamination at CPP-32E. The borehole was advanced to basalt and encountered no detectable contamination during field screening. A soil sample collected at the 40.3- to 42.3-ft depth interval had a gross alpha level of 26 pCi/g and a gross beta level of 29 pCi/g. Uranium-234 and U-238 were also detected in the sample at concentrations of 1.53 and 1.61 pCi/g, respectively. These results helped determine that the release at CPP-32E was not extensive and did not contaminate soil to the south and west of the release point.

An estimate of Cs-137 and Sr-90 activity remaining was made for the release site using the area of contamination and depth. Process knowledge cannot be applied in this case because a release volume would be difficult to estimate and because most of the contamination was likely removed in 1976. The contaminated area and depth for CPP-32E was 14 ft² and 5 ft, respectively, resulting in a contaminated volume of 70 ft³. Performing the mass conversion for soil and multiplying it by the average Cs-137 activity level (209 pCi/g) from the CPP-32E borehole results in a total Cs-137 activity of 8.3×10^4 Ci. Doubling the Cs-137 activity to account for Sr-90 results in a release of 1.66×10^3 curie Cs-137 and Sr-90.

3.1.7.2 CPP-32W. During the operation of the tank farm, significant volumes of water enter the tank vaults that require removal. The source of the water is mainly from the infiltration of precipitation, and the greatest volumes accumulate during the spring due to snow melt and rainfall. Prior to 1973, the vault water was pumped into the corresponding storage tank as a means of disposal. However, due to the volume of water accumulating in the vaults, storage capacity in the storage tanks became a concern and a decision was made to transfer the tank vault water directly to the PEW holding tank (WL-102). Generally, the vault water contains low levels of contamination and can be processed by the PEW.

Early in 1973, a temporary transfer line was installed on the surface of the tank farm enabling the transfer of tank vault water to the PEW. The line was constructed of threaded, 2-in.-diameter carbon-steel pipe that was connected using threaded union connectors and/or threaded pipe couplings. The unions were installed to allow easy removal of pipe sections to facilitate vehicle traffic in the tank farm. The temporary pipeline was used for approximately 4 years until a permanent buried transfer system was installed in 1977. The CPP-32W release was most likely due to minor leakage at a coupling or union in the line connecting the WM-187 tank vault to the main portion of the temporary line.^c Records for the WM-187 vault indicate that four transfers were conducted through the temporary line to the PEW. The transfer volumes were 8,840 gal in September 1973; 7,200 gal in August 1974; 10,450 gal in July 1975; and 5,480 gal in December 1976, totaling approximately 32,000 gal (Rebish 1993). The last transfer occurred on December 3, 1976, shortly before the CPP-32W contaminated area was discovered.

According to personnel familiar with the operation of the temporary transfer line, the amount of leakage from the pipe line would have been minimal. The reasons for the minimal leakage estimate include the following:

- The transfer line was fully visible.

c. Dan Staiger, BBWI, personal communication to Kenneth Manchester, MSE, April 2004.

- The transfers were completed during day shifts, which allowed observation of the line during transfers.
- The line was inspected during transfers to detect leaks. If leaks were detected, the transfer was stopped and the leak was repaired.
- The transfers lasted a short period of time (less than 2 hours). The flow rate through the pipe was estimated to be around 60 gpm.
- The transfer line only saw pressures of 5 psi or less.
- Blotting paper was used to contain leakage where minor dripping occurred at pipe connections.

Analytical data for the WM-187 tank vault water had Cs-137 activities ranging from 1×10^4 to 2×10^5 decays per second per mL (d/s/mL) (Swenson 1998). The vault water had contamination because it also contained small amounts of waste that occasionally leaked from valves into valve boxes, which drained into the tank vaults. The WM-187 tank vault had also been contaminated by a previous tank-siphoning incident. Converting the d/s/mL values yields concentrations of Cs-137 ranging from 0.00027 to 0.0054 Ci/L. The Cs-137 concentration of the water transferred in December 1976 had a Cs-137 concentration of 0.00064 Ci/L based on an analytical result of 2.376×10^4 d/s/mL for a sump water sample collected in August 1976.

Based on the data presented, the contamination associated with the CPP-32W release site appears to be minimal. Assuming that a minor leak occurred at one of the unions during the four transfers from the WM-187 tank vault, a reasonable source term can be established. Assuming a flow rate of 20 gpm through the 2-in. transfer line and a total volume of 32,000 gal transferred yields a total transfer time of 533 minutes or 8.9 hours. Assuming a 30 mL/min leak rate results in a total volume of 16 L or 4.2 gal. Multiplying the estimated leak volume of 16 L by the August 1976 analytical number yields a total Cs-137 activity of 0.01 Ci. Doubling the activity for Sr-90 results in a 0.02 Ci release, assuming the Cs-137 to Sr-90 ratio is 1:1.

3.1.8 Site CPP-16

Site CPP-16 (Figure 3-35) is the site of a leak that occurred on January 16, 1976, through an open-bottom, unnamed valve box during a routine transfer from tank WM-181 to PEW tank WL-102. Waste solution was observed leaking from the flange on one of the diversion valves (PUV-127). Steam from the jetting operations heated the flange and caused the Teflon-type gasket to become soft and flow. The gasket had evidence of flow and had flange markings showing that construction crews improperly installed the gasket in 1972.

In November 1972, tank WM-181 was emptied to create liquid storage for diverted service waste during construction of the VES-191 aboveground storage tank. WM-181 was used for this purpose from April 1973 through April 1977. Periodically during this time, service waste was diverted from its normal disposal route to WM-181 due to elevated radioactivity in the waste water. The diverted service waste was then transferred periodically from WM-181 to the PEW holding tank WL-102 through valve PUV-127. The first transfer of diverted service waste from WM-181 to the PEW occurred in April 1975, where 58,400 gal were transferred during the month. In the following month, an additional 17,600 gal were transferred to the PEW for a 2-month total of 76,000 gal. Approximately eight individual events were necessary to transfer the total volume. No leaks in the valves were reported during these transfers.

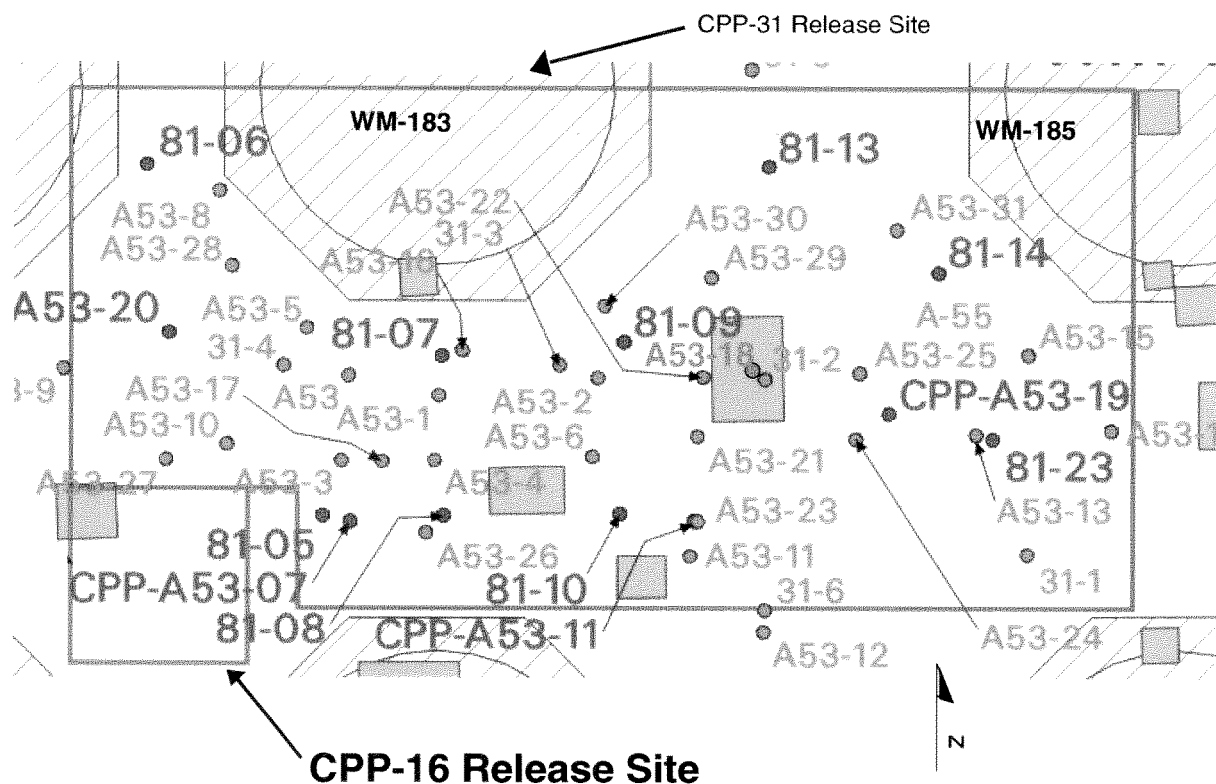


Figure 3-35. Site CPP-16 location map.

The next transfer occurred on January 16, 1976, when the leak occurred. During the transfer, the leak was discovered and the transfer was halted. Transfer records indicated that 6,100 gal of waste were removed from WM-181 and WL-102 received 3,500 gal.^c Assuming a 10% jetting volume increase, a starting volume of 6,710 gal (6,100 + 610 gal) was used. Subtracting the volume received at WL-102 from the starting volume resulted in 3,210 gal released (2,890 gal waste and 320 gal jet dilution water).

The water from the leak of the diverted service wastewater drained out of the bottom of the valve box into the soil beneath the valve box, which was at a depth of 5.7 ft (WINCO 1976, 1991). A 1-in. Schedule 40 carbon-steel pipe was driven 3 ft into the soil on the north side of the piping to determine the depth of contamination. Thermoluminescent dosimetry (TLD) chips were lowered into the pipe and found radiation readings ranging from 0.4 R/hr at the bottom of the pipe to 21.4 R/hr at the 1.0-ft depth. The pipe was then driven 2 ft deeper and additional readings were collected. These additional readings were as follows:

- 0' - 9.66 R/hr
- 1' - 19.2 R/hr
- 2' - 12.0 R/hr
- 3' - 0.33 R/hr

c. Dan Staiger, BBWI, personal communication to Kenneth Manchester, MSE, April 2004.

4' - 0.17 R/hr

5' - 0.15 R/hr.

These readings suggested that most of the contamination remained in the 3 ft of soil immediately below the valve box, or from the 5.7- to 8.7-ft depth interval measured from land surface. A gamma scan was performed on the soil sample collected from the bottom of the valve box and is summarized in Table 3-11. The sample was collected for screening purposes; therefore, the data will only be used as an indication of what gamma-emitting radionuclides were present at the release.

In reviewing the radiological data, the radionuclide concentrations measured in the soil sample appear to be relatively low in comparison to the radiation readings measured in the driven pipe. The location of the soil sample collection point was not documented. Based on the low radionuclide concentrations, the sample may have been collected in an area of the valve box that received very little of the leaking water and was not representative of the most contaminated soil. The downhole readings suggest that a significant portion of the contamination partitioned to the soil 3 ft below the bottom of the valve box. However, some of the more mobile radionuclides, such as Sr-90, may have been transported deeper into the alluvium.

The valve box was replaced during the Idaho Chemical Processing Plant (ICPP) Radioactive Liquid Waste System Improvement project in 1977 with valve box C-8. The new valve box had a stainless-steel lined concrete floor and sump that extends 6 ft 9 in. bgs. The original lines leading to the old valve box were maintained with the exception of the line originating from WM-181. Since WM-181 was no longer needed for storage of diverted service waste, the line coming into the original valve box was cut and capped. Specifics about what was encountered during the construction activities—that is, how much soil was removed or how much remains—are unknown. Site CPP-16 was originally included in OU 3-07, which underwent a Track 2 investigation in 1992 (WINCO 1993a). The Track 2 was performed on the basis of the information available, and CPP-16 was recommended for No Further Action based on the depth of the contamination (WINCO 1993a; DOE-ID 1994). Site CPP-16 is being reinvestigated because consolidation of all tank farm soil and sites within CPP-96 subject CPP-16 to OU 3-14 RI/FS activities.

Process knowledge was used to estimate the upper limit of the Cs-137 and Sr-90 curie content remaining at the site. On the basis of service waste transfer records from WM-181 to WL-102, a release of 3,210 gal occurred. The composition of the released water was determined by reviewing historical waste transfer records. On the basis of records of waste going into and out of WM-181, the liquid being transferred at the time of the release consisted of 5% PEW evaporator bottoms and 95% diverted service waste. Diverted service waste consisted of plant wastewater, including process cooling waters, steam condensates, off-gas condensates, and PEW condensates. The average flow rate for the PEW condensates was 12,000 gal per day (or less) when the PEW evaporator was operating, and 1.0 to 1.5M gal per day for the remainder of the service waste stream. This results in an approximate 100:1 dilution of the PEW condensates. Typically, any trace amounts of radionuclides found in the service waste originates from the PEW condensates.

The released waste mixture had elevated concentrations of radionuclides compared to typical service waste alone. To develop a source term for the release site, 5% of the liquid released (145 gal) was assumed to have a similar composition to sodium-bearing waste stored in WM-180, -181, -184, and -186. The Cs-137 concentrations in these tanks ranged from 23.7 to 37.6 mCi/L, depending on sample date and type of fuel rods processed. The average Sr-90 concentrations ranged from 24.5 to 35.3 mCi/L. Using the

Table 3-11. Gamma scan results for a soil sample collected from the CPP-16 release site.

Sample	Ce-144 (pCi/g)	Co-60 (pCi/g)	Cs-134 (pCi/g)	Cs-137 (pCi/g)	Eu-154 (pCi/g)	Ru-106 (pCi/g)	Sb-125 (pCi/g)
Soil grab sample from the floor of the valve box	6.21	1.08	17.66	325.6	3.23	43.91	6.89

highest values measured and converting the values to curies per gallon results in a Cs-137 concentration of 142.1 mCi/gal and a Sr-90 concentration of 133.4 mCi/gal. Multiplying this curie content by the 5% volume of 145 gal results in loss of 39.9 Ci of Cs-137 and Sr-90. To determine the Cs-137 and Sr-90 activity contained in the remaining 2,745 gal of diverted service waste, effluent discharge records were reviewed for December 1975 when most of the service waste diversions to tank WM-181 occurred. For the month, 1.8 mCi of Cs-137 and 13.6 mCi of Sr-90 were contained in the 23,230,00 gal of service waste.^d On the basis of this data, the average Cs-137 and Sr-90 concentrations for the service waste were 77 and 585 pCi/gal, respectively. Multiplying these concentrations by the 2,745 gal released results in 2.11×10^{-7} Ci of Cs-137 and 1.61×10^{-5} Ci of Sr-90. Comparing the activity of Cs-137 and Sr-90 released from the diverted service waste to the activity released from the 5% PEW bottom component shows that the service waste component is a small fraction of the total amount released at CPP-16.

In summary, the total amount of Cs-137 and Sr-90 activity released at CPP-16 is approximately 40 Ci. The OU 3-14 Tank Farm Soils and Groundwater RI source terms for the more mobile radionuclides, e.g., I-129 and Tc-99, will be developed using the appropriate waste stream ratios when analytical data are insufficient (see Section 3).

3.1.9 Site CPP-20

Site CPP-20 is at a location north of building CPP-604 (Figure 3-1) to which acidic (i.e., pH <2) radioactive liquid waste from INEEL facilities was transported and unloaded via transfer hoses to an underground storage tank. The unloading area was used for this purpose until 1978. The waste was destined for treatment in the PEW evaporator. Small spills would occasionally occur through holes in the pressurized transfer line as waste was being unloaded, which resulted in soil contamination. It has been reported that the spills were cleaned up as they occurred, but no records exist documenting the types, quantities, and locations of the spills or verifying the effectiveness of cleanup activities.

The entire CPP-20 area was excavated down to the top of the CPP-604 tank vault (approximately 30 ft below the building access door) in 1982 as part of the Fuel Processing Facility Upgrade Project (Figures 3-36, 3-37, 3-38, and 3-39). New buried waste lines were installed from building CPP-601 to the CPP-604 tank vault. Personnel involved in the project indicated that the bottom 10 ft of the excavation was backfilled with contaminated soil that had contact radiation levels of 5 mR/hr or less. The source of the contaminated soil is unknown, but the source is likely within the tank farm. The remaining 30 ft of the excavation was reportedly backfilled with clean (i.e., not radiologically contaminated) soil. Portions of the area were excavated a second time again as a different phase of the Fuel Processing Facility Upgrade Project in 1983 to 1984. At the location of valve box C-30, contaminated soil was encountered and removed. The bottom 10 ft of the excavation was reportedly backfilled with contaminated soil that had contact radiation levels of 3 mR/hr or less, and the remainder of the excavation was backfilled with clean soil from the Central Facilities Area.

d. Mike Swenson, BBWI, personal communication to Kenneth Manchester, MSE, May 12, 2004.



Figure 3-36. Excavation in 1982 north of building CPP-604 looking west showing the soil that was removed.



Figure 3-37. Closeup view of 1982 excavation north of building CPP-604 showing the soil that was removed.



Figure 3-38. Northeastern view of 1982 excavation north of building CPP-604 showing extent of excavation through the CPP-20 and CPP-25 release sites.